

SOV/56-36-6-13/66

24(5)

AUTHOR: Shul'man, L. A.

TITLE: On the Theory of the Spin-electron Resonance of the F-Centers in Crystals With the Lattice-type of NaCl (K teorii spin-elektronnogo rezonansa F-tsentrov v kristallakh s reshetkoy tipa NaCl)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 36, Nr 6, pp 1709-1716 (USSR)

ABSTRACT: The paramagnetic resonance absorption of radiofrequencies by F-centers has already been repeatedly investigated both experimentally and theoretically. The theoretical investigations are based either on the de Boer model, according to which the F-centers are looked upon as vacancies of negative ions containing an electron, or upon the Hilsch-Pohl model, according to which the F-centers are considered to be the excess ions of a metal, where there are electrons. The present paper first discusses a large number of earlier papers, and the ground state of the F-center is theoretically investigated both according to the de Boer model and also according to the Hilsch-Pohl model. In the following chapter the coupling con-

Card 1/3

On the Theory of the Spin-electron Resonance of
the F-Centers in Crystals With the Lattice-type of NaCl

SOV/56-36-6-13/66

stant of the spin Hamiltonian is calculated (according to the de Boer model) in consideration of the overlapping of the eigenfunctions of the neighboring ions for the F-centers in molecular orbit approximation; also the anisotropy of the spin Hamiltonian is taken into account. On the basis of the molecular orbit method a theory of the r.f. absorption by F-centers is developed; this theory is free from parameters and makes it possible to compare calculated with experimental data (Refs 7,8). In the next chapter the absorption theory for radiowaves by F-centers for the model by Hilsch and Pohl (also in molecular orbit approximation) is developed; the hyperfine interaction between the F-center electron and magnetic moments of the nuclei of the first and second coordination spheres were taken into account. It was found that the character of the paramagnetic resonance absorption spectra for the two models of F-centers differs essentially, which fact has already been established by other authors (Refs 11,12). It is thus possible, from the shape of the absorption bands (shape and width, figures 1 and 2), to draw conclusions as to the F-center model suited for the crystal under investi-

Card 2/3

On the Theory of the Spin-electron Resonance of
the F-Centers in Crystals With the Lattice-type of NaCl

SOV/56-36-6-13/66

gation. Good agreement is attained by a comparison of theoretical and experimental data for the KCl-crystal. The author finally thanks M. F. Deygen for suggesting the subject and for his interest in this investigation. There are 2 figures, 1 table, and 17 references, 8 of which are Soviet.

ASSOCIATION: Tadzhikskiy gosudarstvennyy universitet (Tadzhik State University)

SUBMITTED: October 3, 1958

Card 3/3

SHUL'GA, L. P., Cand Phys-Math Sci (diss) "A theory for the electron-spin resonance of F-centers in ionic crystals with a lattice similar to NaCl,"
Stalinabad 1960, 11 pp, (Central Asian State University imeni V. I. Lenin).
(SI, 40-60, 120)

86814

S/185/60/005/001/014/018
A151/A029

300(3203, 1043, 1044)

AUTHOR: Shul'man, I. A.

TITLE: The Spin-Electronic Resonance in F-Centers

PERIODICAL: Ukrayins'kyy Fizychnyy Zhurnal, 1960, Vol. 5, No. 1, pp. 117 - 119

TEXT: The paper discusses the resonance absorption of radio-frequencies by an ion crystal which contains F-centers. The F-center is an electron localized in the two nearest vacancies which have a contrary symbol. A smoothened wave function of the basic state of a crystal containing F-centers differs considerably from the spherically-symmetrical smoothened function of the F-center (Ref. 1). When the calculation of the width and the shape of the absorption band of a spine-resonant crystal with an F-center is based on the application of the wave function of the F-center (continuous model), then the shape of the band will be close to that of Gauss, the width of the band, however, will somewhat decrease as compared to the results for the crystal with a F-center. This decrease is connected with the absence of one positive ion. As shown in this paper, qualitatively better results can be obtained from the investigation of the paramagnetic absorption in a crystal with F-centers. This investigation is based on a molecular-orbital approximation. In this connection, it is possible to draw a con-

Card 1/3

86814

S/185/60/005/001/014/018

A151/A029

The Spin-Electronic Resonance in F-Centers

clusion from the experimental data, which produces a more favorable description of the properties of the F-center according to its models (Refs. 2 and 3). In the case of this comparison, one should bear in mind that the application criteria of the macroscopic approximation for the alkaline-haloid crystals (for which a calculation is made in this paper) are not very exact. A series of numerical calculations made by the author leads to the following results: for the crystal KCl $\Delta h \approx 75$ Oe, $h_m = 38$ Oe, $\mu = 0.04227$, $\gamma = 4.942$; for the crystal NaCl $\Delta h \approx 253$ Oe, $h_m = 65$ Oe, $\mu = 0.02164$, $\gamma = 6.586$. In both cases, the parameters of γ correspond to the lowest energy value. The shape of the bands is similar to that investigated in References 7 and 8 according to Hilsh (Hil'sh) and Pole (Pol) for the F-centers, but here the parameters of the bands are different. As seen from the data presented, the individual maxima in the band can be solved experimentally. The derived values of the absorption band parameters show that the phenomenon of the spin-electronic resonance can be utilized as a method for finding the F-centers. It should be pointed out that the calculation carried out is rather approximate, since the polarization of the surroundings by the localized electron, as well as its interaction with the nuclei of the other coordination sphere, were not taken into consideration. It was assumed that the nuclei were fixed in the units of the lattice. The consideration of these factors, however, should not

Card 2/3

86814

S/185/60/005/001/014/018

A151/A029

The Spin-Electronic Resonance in F-Centers

change the obtained results from the qualitative point of view. In closing, the author thanks M.K. Deyhen for the discussion of results and for the valuable remarks. There are 8 references: 7 Soviet and 1 English.

ASSOCIATION: Tadzhits'ky derzhavnyy universytet im. V.I. Lenina (Tadzhik State University imeni V.I. Lenin)

SUBMITTED: September 16, 1959

✓

Card 3/3

S/159/62/000/006/001/032
E032/E314

AUTHOR: Shul'man, L.A.

TITLE: On the shift in the g-factor in the molecular-orbital model of an F-centre

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Fizika, no. 6, 1962, 5 - 7

TEXT: It is noted that the magnitude of the g-factor differs from the result for an atomic s-electron by $10^{-2} - 10^{-3}$. The present paper is concerned with a theoretical discussion of this difference on the molecular-orbital approximation (second-order perturbation theory). The only experimental parameter which is introduced into the analysis is the energy difference between the ground and the first excited state of the F-centre (ΔE). The analysis is based on the following approximate expression for the g-factor difference

$$\Delta g \approx \frac{e}{2m_e c^2} \cdot \frac{1}{\Delta E} \langle 0 | \hat{L}_z [\underline{E} \times \underline{p}]_z + [\underline{E} \times \underline{p}]_z L_z | 0 \rangle \quad (3)$$

Card 1/3

S/139/62/000/006/001/032
E032/E314

On the shift in

where E is the microscopic electric field, p is the momentum and L the angular momentum. The analysis is confined to the interaction with ions in the first coordination sphere and an explicit expression is obtained for ΔS_{-1} . The final calculated result for KCl, KBr and KI is -4.55×10^{-4} , -4.87×10^{-4} and -4.81×10^{-4} . The measured values reported by G. A. Noble (J.Chem.Phys., 31, 931, 1959) are -7×10^{-5} , -1.6×10^{-4} and -3.2×10^{-4} . The agreement is slightly improved by taking into account ions in the second coordination sphere. The expression for the wave function for the ground state of the F-centre is taken in the present analysis to be in the form

$$\Psi = N \sum_{k=1}^6 \psi_k(r_k), \int |\Psi|^2 d\tau = 1 \quad (7)$$

where N is a normalizing factor, ψ_k are the normalized s-eigenfunctions for isolated atoms in the first coordination sphere and r_k is the distance between the nucleus of the k-th ions to the F-centre electron. It is suggested that a better

Card 2/5

On the shift in

S/139/62/000/006/001/032
E032/E314

agreement with experiment might be obtained by taking the p-
functions into account in Eq.(7). There is 1 table.

ASSOCIATION: Tadzhikskiy gosuniversitet imeni V.I. Lenina
(Tadzhik State University imeni V.I. Lenin)

SUBMITTED: September 7, 1961

Card 3/3

S/051/63/014/002/006/026
E039/E120

AUTHOR: Shul'man, L.A.

TITLE: On the shape and width of the electron paramagnetic resonance absorption curves of F-centers in crystals

PERIODICAL: Optika i spektroskopiya, v.14, no.2, 1963, 220-227

TEXT: Expressions are obtained for the second and fourth moments of electron paramagnetic resonance (EPR) lines of F-centers which depend on hyperfine interactions of localized electrons with the magnetic moment of the nuclear lattice surrounding a negative ion vacancy. The value of the half width of absorption bands with Gaussian form is calculated from the formula:

$$(\Delta\nu)_{1/2} = 2.35 \sqrt{(\Delta\nu)^2} \quad (34)$$

Values of the half width of the absorption bands for a series of alkali halide salts calculated from this expression are compared in the table with the experimental results of a number of authors, and good agreement is obtained. Given in the last column is a value for

Card 1/3

$$(\Delta\nu)^4 / 3 [(\Delta\nu)^2]^2$$

On the shape and width of the ...

S/051/63/014/002/006/026
E039/E120

for three directions of the static magnetic field: a) $H \parallel (100)$; b) $H \parallel (110)$; B) $H \parallel (111)$. As seen from the table this ratio for the series of crystals examined is nearly unity, hence the absorption approximates to Gaussian. The anisotropy connected with the fourth moment is very small. There is 1 table.

The sources referred to in the table are as follows.

- [12] K. Morigaki, J. Phys. Soc. Japan, v.16, 1961, 1645.
- [14] E.E. Schneider, Arch. Sci., v.10, 1957, 120.
- [15] K. Fukuda, H. Matsumoto, A. Okuda.
J. Phys. Soc. Japan, v.14, 1959, 969.
- [1] A.F. Kip, C. Kittel, R.A. Levy, A.M. Portis.
Phys. Rev., v.91, 1953, 1066.

SUBMITTED: March 13, 1962

Card 2/3

On the shape and width of the ...

S/051/63/014/002/006/026
E039/E120

Table

Crystal	$(\Delta H)_{1/2, 0e}$		Source of experimental data	$\frac{(\Delta \nu)^4}{3 [(\Delta \nu)^2]^2}$
	Calculated	Experimental		
Li^7F^{19} {	89.3	90.5	[12] {	a) 0.9206 G) 0.9235 B) 0.9243
$\text{Li}^7\text{Cl}^{35}$ {	- 57.7	90 60	[14] [15] {	a) 0.9652 G) 0.9665 B) 0.9669
$\text{K}^{39}\text{Cl}^{35}$ {	53.6	54	[1] {	a) 0.9475 G) 0.9481 B) 0.9482
$\text{Na}^{23}\text{Cl}^{35}$ {	149.5	162	[1] {	a) 0.9337 G) 0.9349 B) 0.9351

Card 3/3

L 1971-66 EWT(1)/EWP(e)/EWT(m)/EPF(c)/EWP(i)/T/EWP(t)/EWP(b) IJP(c) JD/GG/WH

ACCESSION NR: AP5020314

UR/0379/65/001/003/0367/0372 59

AUTHOR: Danil'chuk, G. S.; Ganyuk, L. N.; Koval'skiy, A. Ye.; Pogoretskiy, P. P.;
Podzyarey, G. A.; Shul'man, L. A.

TITLE: Nitrogen impurity centers in synthetic diamond powders

SOURCE: Teoreticheskaya i eksperimental'naya khimiya, v. 1, no. 3, 1965, 367-372

TOPIC TAGS: diamond, electron spin resonance, impurity center, donor center, nitrogen, coupling constant, magnetic moment

ABSTRACT: A distinguishing feature of the study was the use of polycrystalline diamond samples (powders), all previous studies having been made on single crystals. The object of the work was to study in close detail the electron spin resonance (ESR) of nitrogen donors in synthetic diamond at room temperature, to determine the coupling constants of the Hamiltonian

$$\hat{H} = g\mu (H_s) + a(sI) + b[3s_z I_z - (sI)], \quad (1)$$

on the basis of a study of the form of asymmetrical side satellites of the spectrum, and to investigate the infrared absorption by the powders and compare the results

Card 1/2

L 1971-66

ACCESSION NR: AP5020314

3

with the ESR data. The value of the g-factor was found to be 2.0025 ± 0.0005 . The method of moments was used to study the form of the asymmetrical side peaks of the spectrum, and from this, the coupling constants of hyperfine interaction of the donor electron of nitrogen with its magnetic moment were determined. The coupling constants obtained agreed well with the corresponding values for single crystals of natural diamond. The concentration of donor nitrogen centers was found to be equal to $10^{18}-10^{19} \text{ cm}^{-3}$. In the infrared spectrum of synthetic and natural diamond, an absorption band was observed at 9.1μ which is displayed more rarely in synthetic diamond; it was postulated that this band is primarily due to aggregated nitrogen centers. Orig. art. has: 2 figures, 1 table, and 8 formulas.

ASSOCIATION: Ukrainskiy NII sinteticheskikh sverkhтвердых материалов, Kiev
(Ukrainian Scientific Research Institute of Synthetic Ultrahard Materials)

SUBMITTED: 31Dec64

ENCL: 00

SUB CODE: GC, IC

NO REF SOV: 008

OTHER: 008

Card 2/2

SP

DANIL'CHUK G.S.; GANYUK, L.N.; KOVAL'SKIY, A.Ye.; POGORETSKIY, P.P.;
PODZYAREY, G.A.; SHUL'MAN, L.A.

Impurity centers of nitrogen in synthetic diamond powders.
Tsecret. i eksper. khim. 1 no.3:367-372 My-Je '65. (MIRA 18:9)

1. Ukrainskiy nauchno-issledovatel'skiy institut sinteticheskikh
sverkhtverdykh materialov, Kiyev.

L 38701-66 EWP(c)/EWT(m)/EWP(t)/ETI IJP(c) JD
 ACC NR: AP6017526 (A) SOURCE CODE: UR/0379/65/001/006/0830/0833

AUTHOR: Shul'man, L. A.; Podzyarey, G. A.

ORG: Ukrainian NII of Superhard Materials, Kiev (Ukrainskiy NII sinteticheskikh sverkhтверdykh materialov)

TITLE: Dipole-dipole and exchange interaction in nitrogen impurity centers in synthetic diamonds

SOURCE: Teoreticheskaya i eksperimental'naya khimiya, v. 1, no. 6, 1965, 830-833

TOPIC TAGS: diamond, EPR spectrum, dipole interaction, *impurity center*

ABSTRACT; A critical review is given of EPR spectra of synthetic polycrystalline diamonds containing nitrogen impurities. The EPR spectrum taken at room temperature is shown in Fig. 1. The weak lines (α) are assigned to the exchange interaction among the atom pairs within the diamond lattice. Such weak lines were found to be characteristic for synthetic diamonds containing nitrogen impurities of the order of 10^{20} per cubic centimeter. Orig. art. has: 1 figure and 6 formulas.

Card 1/2

L 38701-66
ACC NR: AP6017526

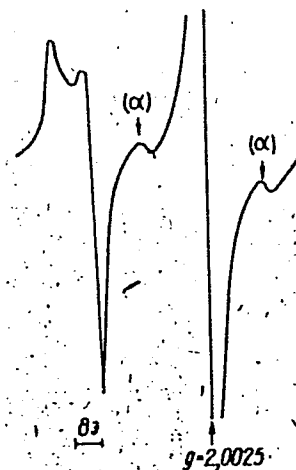


Fig. 1.

SUB CODE: 11,20/ SUBM DATE: 03May65/ ORIG REF: 006/ OTH REF: 005

Card 2/2 Sh

ACC NR: AP6024490

SOURCE CODE: UR/0181/66/008/007/2213/2217

41
38
B

AUTHOR: Ryabchenko, S. M.; Shul'man, L. A.

ORG: Institute of Physics AN UkrSSR, Kiev (Institut fiziki AN UkrSSR)

TITLE: Influence of strong exchange interaction in $\text{CuCl}_2 \cdot 2\text{H}_2\text{O}$ crystal on the EPR line broadening

SOURCE: Fizika tverdogo tela, v. 8, no. 7, 1966, 2213-2217

TOPIC TAGS: copper compound, chloride, epr spectrum, line broadening, exchange interaction

ABSTRACT: The effect of the exchange interaction on the EPR line broadening was investigated by the method of moments. The exchange interaction is assumed to exceed the Zeeman interaction. The measurements were made at 9320 Mcs at 300, 77, and 20.4K, and the exchange constants were evaluated for the three temperatures. The second and fourth moments of the EPR absorption curve were then calculated, from which the isotropic exchange interaction with the ion in the second coordination sphere is estimated to be 3×10^{-17} erg. The values of coefficient of anisotropic exchange interaction with the ion of the first coordination sphere were calculated from the second and from the temperature-dependent first moments of the absorption curve, and found to be $J_{aa} = -2.6 \times 10^{-17}$, $J_{bb} = -2.3 \times 10^{-17}$, and $J_{cc} = +4.8 \times 10^{-17}$ erg. The

Card 1/2

ACC NR: AP6024490

3

various assumptions made in the calculations are discussed. The results are in satisfactory agreement with the theoretically expected values. The authors thank A. F. Prihot'ko and M. F. Deygen for valuable hints and a discussion of problems touched upon in the paper, and V. S. Frolova for preparing the samples. Orig. art. has: 7 formulas

SUB CODE: 20/ SUBM DATE: 26Nov65/ ORIG REF: 003/ OTH REF: 015.

Card 2/2

ep

L 04141-67 EWI(1)/ENP(e)/EWI(m)/I/ENP(t)/ETI 1JP(s) JD/WH
ACC NR: AP6026674 SOURCE CODE: UR/0181/66/008/008/2307/2312 47
AUTHOR: Shul'man, L. A.; Zaritskiy, I. M.; Podzyarey, G. A. 47
ORG: Institute of Superhard Materials, Kiev (Institut sverkhтвердых материалов) B
TITLE: Reorientation of the Jahn-Teller displacement in nitrogen impurity centers in diamond 27
SOURCE: Fizika tverdogo tela, v. 8, no. 8, 1966, 2307-2312
TOPIC TAGS: impurity center, nitrogen, diamond, EPR, NMR, single crystal structure, crystal dislocation
ABSTRACT: The dynamic manifestation of the Jahn-Teller (J-T) effect in diamonds with nitrogen content is investigated by means of a radio spectrometer over a temperature range from 77 to 870K. The changes with temperature of the EPR spectra of nitrogen obtained both for natural diamond single crystals and synthetic polycrystalline diamond are examined. At temperatures below 570K, the localization of an excess nitrogen electron on a given C-N pair, and the corresponding J-T displacement in the C-N pair are practically "frozen." With increasing temperature, the increased thermal mobility of the particles may lead to a reorientation of the J-T displacement, the reorientation frequency increasing with temperature. This permits the electron to overcome a certain potential barrier and to localize at a neighboring C-N pair. The
Card 1/2

L 0414 67

ACC NR: AP6026674

process repeats itself, and may be interpreted as a dynamic manifestation of the J-T effect. The reorientation of the J-T displacement can be described in analogy with the process of retarded rotation of molecular complexes, observed in NMR. The authors are indebted to T. A. Nachal'naya for taking part in the processing of the experimental data. Orig. art. has: 3 figures and 6 formulas.

SUB CODE: 20⁰⁸ SUBM DATE: 22Nov65/ ORIG REF: 008/ OTH REF: 005

Card

2/2

SHIROKOV, Sergey Ivanovich, inzh. [deceased]: Prinimali uchastiye:
ZAYETS, V.N., dotsent; GUREVICH, M.I., dotsent. STADNIKOV, G.D.,
inzh., retsenzent; SHUL'MAN, L.G., inzh., retsenzent; DUGINA,
N.A., tekhn.red.

[Production of boilers] Kotel'noe proizvodstvo. Izd.3. Moskva,
Gos.nauchno-tekhn.izd-vo mashinostroit.lit-ry, 1960. 280 p.
(MIRA 14:3)

(Boilers)

3,1710
3,1700

40346
S/194/62/000/006/169/232
D201/D308

AUTHOR: Shul'man, L.M.

TITLE: A possibility of increasing the resolving power of radio-telescopes

PERIODICAL: Referativnyy zhurnal. Avtomatika i radioelektronika, no. 6, 1962, 37, abstract 6Zh251 (Visnik Kyivsk, un-tu, 1960 (1961), no. 3, ser. astron., fiz ta khimiy, no. 2, 117-123)

TEXT: The author proposes a new method of decreasing the beam-width of interferometers in one plane by means of angular separation of diagrams of two aerials and by separating the radiation coming from the overlap region of both diagrams. The effective power diagram of such a system is determined by the equation $F(\varphi) = c^2 [(f_1 + f_2) - (f_1 - f_2)]^2$, where $f_1(\varphi)$, $f_2(\varphi)$ are voltage radiation patterns of separate aerials. It is shown that such a method can be realized by means of using double modulation of the signal: 1) By periodical switching of the receiver from the aerial over to the Card 1/2

A possibility of increasing the ...

S/194/62/000/006/169/232
D201/D308

aerial equivalent with a frequency Ω_1 ; 2) By periodically connecting two aerials in phase and out of phase at a frequency $\Omega_2 \ll \Omega_1$. Principles of separating out the necessary signal are discussed. It is shown that it is possible to increase the resolving power four or more times. [Abstracter's note: Complete translation.]

Card 2/2

L 16877-63 EWT(1)/FCS(k)/FBD/FCC(w)/BDS/EED-2/ES(t)-2/ES(v)/EEG-2 ASD/
ESD-3/APGC/AFFTC P1-4/Pj-4/Pl-4/Pe-4 PT-2/WR
ACCESSION NR: AR3006332 S/0058/63/000/007/H040/H040

SOURCE: RZh. Fizika, Abs. 7Zh272

AUTHOR: Shul'man, L. M.

TITLE: New method of increasing the resolution of radio telescopes

CITED SOURCE: Publikatsii Kiyevsk. astron. observ., no. 11, 1962,
108-110

TOPIC TAGS: radio telescope , resolution, antenna spacing, antenna
phasing

TRANSLATION: It is proposed to increase the resolving power of a
radiotelescope by placing two antennas at one point in such a way
that their diagrams in any plane are shifted relative to one another
by an angle $\delta\varphi$; by periodically switching the antennas from n-phase
to antiphase connection and by separating the signal at the switching

Card 1/2

L 16877-63

ACCESSION NR: AR3006332

frequency, it is possible to write down the intensity of radiation arriving from the region of the mutual overlap of the two diagrams. The resolving power of the radiotelescope is defined as the width of the principal lobe of the diagram at half power. A plot showing the dependence of the ratio $\Delta\varphi/\Delta\varphi_0$ on $\delta\varphi$ is presented ($\Delta\varphi_0$ and $\delta\varphi$ are the half-power widths of the diagrams of one antenna and of the system, respectively) and the ratio of the effective areas of the system and of one antenna for a specific antenna consisting of eight non-directional elements; the distance between elements is $\lambda/2$. When the diagram is narrowed down by 3--5 times, the gain decreases by 2--4 times. It is proposed to use this method to observe radio emission bursts from the sun. See also RZhFiz 1962, 6Zh251.
A. Khanberdiyev.

DATE ACQ: 15Aug63

SUB CODE: PH, AS

ENCL: 00

Card 2/2

L 22192-65 EWT(1)/EWG(k)/EPA(sp)-2/EWG(v)/EPA(w)-2/EEC(t)/T/EEC(b)-2/EWA(m)-2
 Pz-6/PO-4/Pab-10/Pe-5/Pae-2/P1-4 IJP(c)/SSD(b)/AFWL/AEDC(a)/SSD/BSA/ASD(a)-5/
 SSD(c)/AEDC(b)/ASD(f)-3/ASD(p)-3/AFETR/RAEM(c)/RAEM(a)/ESD(g)/ESD(t) AT/GW
 S/2555/64/010/000/0070/0073
 ACCESSION NR: AT4049111

AUTHOR: Shul'man, L.M.

TITLE: Instability of the current layer in nonhomogeneously magnetized plasma ²¹

SOURCE: AN SSSR. Astronomicheskii sovet. Voprosy* kosmogonii, v. 10, 1964.
 Problemy* magnitnoy gidrodinamiki i kosmicheskoy gazodinamiki (Problems in magnetic
 hydrodynamics and cosmic gas dynamics), 70-73

TOPIC TAGS: ^{ry} astrophysics, plasma, magnetized plasma, magnetohydrodynamics,
 cosmic gas dynamics

ABSTRACT: The problem of the stability of plasma near a surface separating regions
 with magnetic fields of opposite sign has been investigated by many authors, but the
 purpose of this study is an analysis of unidimensional nonadiabatic movements of plasma
 near the neutral surface. It is shown that nonadiabatic movements under certain con-
 ditions lead to instability. The author analyzes the unidimensional movements of plasma
 across a magnetic field described by the system of equations: ...

$$\frac{\partial v}{\partial t} + v \frac{\partial v}{\partial x} + \frac{1}{\rho} \frac{\partial p}{\partial x} = 0; \quad (1)$$

$$\frac{\partial \rho}{\partial t} + v \frac{\partial \rho}{\partial x} + \rho \frac{\partial v}{\partial x} = 0; \quad (2)$$

Card 1/3

L 22192-65
ACCESSION NR: AT4049111

$$\frac{\partial H}{\partial t} + v \frac{\partial H}{\partial x} + H \frac{\partial v}{\partial x} - v \frac{\partial^2 H}{\partial x^2} = 0; \quad (3)$$

$$\frac{\partial p}{\partial t} + v \frac{\partial p}{\partial x} + \left[\gamma p + (2 - \gamma) \frac{H^2}{4\pi} \right] \frac{\partial v}{\partial x} - \frac{v}{4\pi} \left[H^2 \frac{\partial^2 H}{\partial x^2} + (\gamma - 1) \left(\frac{\partial H}{\partial x} \right)^2 \right] + (\gamma - 1) q = 0, \quad (4)$$

where p denotes the sum of the magnetic and gas pressures, γ is the adiabatic index, η is magnetic viscosity, and q is the thermal loss of a unit volume in a unit time. The initial system was written and is analyzed on the assumption that $\gamma = \text{const}$. At equilibrium the following applies

$$v = \frac{\partial v}{\partial t} = \frac{\partial v}{\partial x} = \frac{\partial H}{\partial t} = \frac{\partial p}{\partial t} = \frac{\partial p}{\partial x} = 0. \quad (4a)$$

This leads to the relation

$$p = \text{const}; \quad (5)$$

$$\frac{\partial H}{\partial x} = \text{const}; \quad (6)$$

$$(\gamma - 1) q = \frac{v}{4\pi} \left[H^2 \frac{\partial^2 H}{\partial x^2} + (\gamma - 1) \left(\frac{\partial H}{\partial x} \right)^2 \right]. \quad (7)$$

Card 2/3

L 22192-65
ACCESSION NR: AT4049111

The stability of plasma described by system (1)-(4) is strongly dependent on heat transfer, that is, on the specific form of the function q . The author considers two simple cases in detail: 1. Compression occurs isobarically; 2. At the time of compression the value q does not deviate from its equilibrium value (7). The results of the author's analyses show that plasma is unstable near the neutral plane due to its nonadiabatic behavior. (Although the method used for taking heat transfer into account is not fully justified and the dependence of magnetic viscosity on temperature is neglected, the author feels that these factors do not lessen the validity of the above conclusion.) "The author wishes to thank D. A. Frank-Kamenetskiy for assistance in formulating the problem and for valuable advice, as well as M. V. Konyukov for pointing out a possible objection." Orig. art. has: 16 formulas.

ASSOCIATION: none

SUBMITTED: 00

ENCL: 00

SUB CODE: AA, ME

NO REF SOV: 007

OTHER: 001

Card 3/3

SHUL'MAN, L.M.

Origin of atmospheric sodium. Geofiz. i astron. no.8:46-53 '65.

(MIRA 19:1)

1. Astronomicheskaya observatoriya Kiyevskogo gosudarstvennogo universiteta.

24712-66 EWT(1)/ETC(f)/EPF(n)-2/EWG(m) IJP(c) GS/AT/GW

ACC NR: AT6014847

SOURCE CODE: UR/0000/66/000/000/0095/0100

AUTHOR: Shul'man, L. M.

ORG: none

TITLE: Selection of a preflare plasma state model

SOURCE: AN UkrSSR. Voprosy astrofiziki (Problems in astrophysics). Kiev, Izd-vo Naukova dumka, 1966, 95-100

TOPIC TAGS: solar physics, flare, flare model, chromospheric flare, plasma physics

ABSTRACT: Research at the Crimean Astrophysical Observatory has shown that during the flare process, plasma changes from an "excited" equilibrium state with excess magnetic energy into another equilibrium state accompanied by the transformation of magnetic field energy into kinetic and thermal plasma energy, or radiation and fast particle energy. Various quantitative model theories are examined to determine which best satisfies this qualitative explanation. The selection of models of the preflare plasma state is restricted by the condition that thermal and electrodynamic equilibrium must accompany the mechanical equilibrium. Model theories proposed by A. B. Severnyy, C. de Jager and M. Kuperus, G. M. Nikol'skiy and M. A. Livshits, J. W. Dungey, and P. A. Sweet are analyzed on this basis. The configuration proposed by Sweet is considered to correspond best with actual conditions. Orig. art. has: 14 formulas.

SUB CODE: 03/ SUBM DATE: 22Jan66/ ORIG REF: 013/ OTH REF: 004/ ATD PRESS: [DM]

L 24712-66 EWT(1)/ETC(f)/EPF(n)-2/EWG(m) IJP(c) GS/AT/GW.

ACC NR: AT6014847

SOURCE CODE: UR/0000/66/000/000/0095/0100

AUTHOR: Shul'man, L. M.

53

BT1

ORG: none

21

TITLE: Selection of a preflare plasma state model

SOURCE: AN UkrSSR. Voprosy astrofiziki (Problems in astrophysics).
Kiev, Izd-vo Naukova dumka, 1966, 95-100

TOPIC TAGS: solar physics, flare, flare model, chromospheric flare,
plasma physics

ABSTRACT: Research at the Crimean Astrophysical Observatory has shown that during the flare process, plasma changes from an "excited" equilibrium state with excess magnetic energy into another equilibrium state accompanied by the transformation of magnetic field energy into kinetic and thermal plasma energy, or radiation and fast particle energy. Various quantitative model theories are examined to determine which best satisfies this qualitative explanation. The selection of models of the pre-flare plasma state is restricted by the condition that thermal and electrodynamic equilibrium must accompany the mechanical equilibrium.

Card 1/2

· L 24712-66

, ACC NR: AT6014847

Model theories proposed by A. B. Severnyy, C. de Jager and M. Kuperus, G. M. Nikol'skiy and M. A. Livshits, J. W. Dungey, and P. A. Sweet are analyzed on this basis. The configuration proposed by Sweet is considered to correspond best with actual conditions. Orig. art. has: 12 formulas.

DM

SUB CODE: 03/ SUBM DATE: 22 Jan 66/ ORIG REF: 013/ OTH REF: 004/
ATD PRESS:

Card 2/2

dy

4245

SHUL'MAN, L.N. (Kiyev)

Rupture of the aorta. Vrach. delo no.6:136-138 Je'63.

(MIRA16:9)

1. Kafedra terapii (zav. - dotsent A.P.Peleghchuk) stomatologicheskogo fakul'teta Kiyevskogo meditsinskogo instituta i patologoanatomicheskaya laboratoriya (zav. - prof. V.L.Bylik) Kiyevskoy klinicheskoy bol'nitsy dlya obsluzhivaniya vodnikov.
(AORTA --WOUNDS AND INJURIES)

SHUL'MAN, L. ~~13~~ -

USSR/Miscellaneous-Metallurgy

Card 1/1

Authors : Belov, P. O., and Shul'man, L. ~~13~~

Title : Mechanization of industrial processes in a profiling steel melting plant

Periodical : Lit. Proizv. 1, 24 - 27, Jan-Feb 1954

Abstract : The workers of the steel melting plant of the Kirev steel mill developed a complex plan for the mechanization of industrial processes in various departments of the mill for the purpose of better and more economical distribution of labor forces. The details of the proposed mechanization plan are described. The planning, preparation and assembly of equipment were carried out within the plant, without outside help, by a specially organized group of engineers, mechanics and workers. Table, drawings.

Institution:

Submitted :

SHUL'MAN, M.

A camera, but which one: with a mirror or a range finder?
Sov. foto 19 no. 4:43-47 Ap '59. (MIRA 12:5)
(Cameras)

SHUL'MAN, M.

New developments in the design of cameras in foreign countries. Sov.
foto 20 no.10:40-41 0'60. (MIRA 13:10)
(Cameras)

VOROB'YEV, V.; SHUL'MAN, M.

Designers are working on these new developments. Sov.foto 21
no.8:28-30 Sov.foto 21 no.8:28-30 Ag '61. (MIRA 14:8)
(Cameras)

SHUL'MAN, M.

Lenses with variable focal distances. Sov.foto 22 no.11:34-36
N '62. (MIRA 16:1)

(Lenses, Photographic)

SHUL'MAN, M.

Twin-lens reflex cameras. Sov. foto 22 no.12:34-36 D '62.
(MIRA 16:1)

(Twin-lens cameras)

SHUL'MAN, M.G., podpolkovnik meditsinskoy sluzhby

Organization and activities of a blood transfusion center in a
garrison hospital. Voen-med. zhur. no.9:66 S '51. (MLRA 9:9)
(BLOOD--TRANSFUSION)

SHUL'MAN, M.G.

Isolated subcutaneous gastric rupture. Khirurgiia, no.4:86 Ap '55.
(STOMACH--WOUNDS AND INJURIES) (MLRA 8:9)

EL'KIN, M.L., polkovnik med.sluzhby; SHUL'MAN, M.G., podpolkovnik med.sluzhby

Preventing surgical shock by injecting intravenously a 1/2 solution
of novocaine. Voen.-med.zhur. no.11:71 N '57. (MIRA 11:4)
(SHOCK) (NOVOCAINE)

SHUL'MAN, M.S., doktor med.nauk

Multiple cancer of the colon. Khirurgiia Supplement:23 '57.
(MIRA 11:4)

1. Iz Sverdlovskogo oblastnogo onkologicheskogo dispansera.
(CLON--CANCER)

SHUL'MAN, M.S., doktor med.nauk

~~Extensive resection of the ileocecal angle in a case of sarcoma.~~
Khirurgiia 34 no.7:129 J1 '58 (MIRA 11:9)

1. Iz Sverdlovskogo oblastnogo onkologicheskogo dispansera.
(ILEUM, neoplasms
ileocecal sarcoma, surg. (Rus))
(SARCOMA, case reports
ileocecal, surg. (Rus))

SHUL'MAN, M.S., doktor med.nauk; KHARIN, L.A. (Sverdlovsk)

Case of primary sarcoma of the pleura. Klin.med. 37 no.12:129-131
D '59. (MIRA 13:4)

1. Iz Oblastnogo onkologicheskogo dispansera g. Sverdlovsk (glavnyy
vrach F.M. Teploukhova, zaveduyushchiy otdeleniyem M.S. Shul'man).
(PLEURA--TUMORS)

SHUL'MAN, M.S. (Sverdlovsk, ul. Kirova, d.7, kv.1)

Retroperitoneal and mesenteric tumors. Vop onk. 10 no.8:105-109
'64. (MIRA 18:3)

1. Iz Sverdlovskogo oblastnogo onkologicheskogo dispansera
(glavnyy vrach - I.A.Arkhangelskaya).

5 (4)

AUTHORS:

Kuznetsova, M. N., Shul'man, M. M.

SOV/79-29-5-69/75

TITLE:

Physico-chemical Analysis of the Reactions of Amines and Acids
(Fiziko-khimicheskiy analiz vzaimodeystviya aminov i kislot).
5. Thermal Analysis of the Three-component System Urea -
Trichloroacetic Acid - Water (5. Termicheskiy analiz troynoy
sistemy mochevina - trikhloruksusnaya kislota - voda)

PERIODICAL:

Zhurnal obshchey khimii, 1959, Vol 29, Nr 5, pp 1737 - 1739
(USSR)

ABSTRACT:

Nine sections of the melting diagram $H_2O - CCl_3COOH - CO(NH_2)_2$
were investigated (Figs 1 and 2). A visual method of thermal
analysis was applied. As the diagram shows (Fig 3), the
stability range of $CO(NH_2)_2 \cdot CCl_3COOH$ covers 60.8% of the
diagram surface. The section $H_2O - CO(NH_2)_2 \cdot CCl_3COOH$ divides
the diagram into two three-component systems:
1) $CCl_3COOH - H_2O - CO(NH_2)_2 \cdot CCl_3COOH$ with the eutectic point
at -38.3° and 2) $H_2O - CO(NH_2)_2 - CO(NH_2)_2 \cdot CCl_3COOH$ with the
eutectic point at -12.5° .

Card 1/2

Physico-chemical Analysis of the Reactions of SOV/79-29-5-69/75
Amines and Acids. 5. Thermal Analysis of the Three-component System Urea -
Trichloroacetic Acid - Water

There are 3 figures and 7 references, 4 of which are Soviet.

ASSOCIATION: Moskovskiy tekhnologicheskii institut myasnoy i molochnoy
promyshlennosti (Moscow Technological Institute for the
Meat Packing and Dairy Industry)

SUBMITTED: October 8, 1958

Card 2/2

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

2

Dielectric constant of the fractions of (poly)cellulose
J. J. Bikerman, U.S.S.R. Acad. Sci. Div. Chem. Sci., 1954, 10, 1111-1114.
Lipatov and M. S. Shulman, Dokl. Akad. Nauk SSSR, 1954, 10, 1111-1114.
553-01(1210).—The dielec. const. of "highly assayed,"
and of "thermolyzed" gelatin is the same and reaches in
1% gelatin soln. the value of 80 at 21-22°. Aging lowers
the dielec. const. of the "assayed," but does not affect
that of the "thermolyzed" gelatin. J. J. Bikerman

ASAC-SLA METALLURGICAL LITERATURE CLASSIFICATION

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

CA

2

Electroviscous effects in gels and sols of agar. M. S. Shulman and A. M. Karel'shtadt. *Colloid J.* (U. S. S. R.) 8, 741-8 (1939).—The viscosity of 0.5% soln. of agar is lowered by BaCl_2 more than by KCl ; the effect is stronger in dialyzed than in electrodialyzed solns. It is concluded that electroviscous effect takes place and that the ions of the double layer are removed by electrodialysis. The swelling of agar is also inhibited by BaCl_2 more than by KCl . Similar results were obtained with agar fractions prepd. by extn. of an agar gel with water of various temps. J. J. Bikerman

COMMON ELEMENTS

COMMON VARIABLE INDEX

OPEN

MATERIALS INDEX

ASTM-SLA METALLURGICAL LITERATURE CLASSIFICATION

1ST AND 2ND LETTERS

3RD AND 4TH LETTERS

5TH AND 6TH LETTERS

7TH AND 8TH LETTERS

9TH AND 10TH LETTERS

11TH AND 12TH LETTERS

13TH AND 14TH LETTERS

15TH AND 16TH LETTERS

17TH AND 18TH LETTERS

19TH AND 20TH LETTERS

21ST AND 22ND LETTERS

23RD AND 24TH LETTERS

25TH AND 26TH LETTERS

27TH AND 28TH LETTERS

29TH AND 30TH LETTERS

31ST AND 32ND LETTERS

33RD AND 34TH LETTERS

35TH AND 36TH LETTERS

37TH AND 38TH LETTERS

39TH AND 40TH LETTERS

41ST AND 42ND LETTERS

43RD AND 44TH LETTERS

45TH AND 46TH LETTERS

47TH AND 48TH LETTERS

49TH AND 50TH LETTERS

51ST AND 52ND LETTERS

53RD AND 54TH LETTERS

55TH AND 56TH LETTERS

57TH AND 58TH LETTERS

59TH AND 60TH LETTERS

61ST AND 62ND LETTERS

63RD AND 64TH LETTERS

65TH AND 66TH LETTERS

67TH AND 68TH LETTERS

69TH AND 70TH LETTERS

71ST AND 72ND LETTERS

73RD AND 74TH LETTERS

75TH AND 76TH LETTERS

77TH AND 78TH LETTERS

79TH AND 80TH LETTERS

81ST AND 82ND LETTERS

83RD AND 84TH LETTERS

85TH AND 86TH LETTERS

87TH AND 88TH LETTERS

89TH AND 90TH LETTERS

91ST AND 92ND LETTERS

93RD AND 94TH LETTERS

95TH AND 96TH LETTERS

97TH AND 98TH LETTERS

99TH AND 100TH LETTERS

1ST AND 2ND ORDERS																										3RD AND 4TH ORDERS																									
PROCESSES AND PROPERTIES INDEX																																																			
<p>CA</p> <p>Change of electrical conductivity of water in supersonic field. S. S. Tumanashvili and M. S. Shul'man. <i>Colloid J.</i> (U. S. S. R.) 5, 961-4 (1930). The cond., measured in the presence of supersonic field, increased after the water was kept for 1-30 min. in a field of 800,000 cycles/sec. The increase was due to soln. of CO₂ from the air.</p> <p>I. I. Bikerman</p>																																																			
<p>ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION</p>																																																			
1ST AND 2ND ORDERS																										3RD AND 4TH ORDERS																									
1ST AND 2ND ORDERS																										3RD AND 4TH ORDERS																									

CA

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

3RD AND 4TH ORDERS

2

COMMON ELEMENTS

COMMON VARIABLES INDEX

Diffusion of electrolytes in gels of gelatin and agar-agar. M. S. Shul'man and A. M. Karil'shtadt. *Colloid. J.* (U. S. S. R.) 6, 379-83 (1940).—The elec. cond. method was successfully used to det. the diffusion of KCl, BaCl₂ and AlCl₃ in gelatin and agar-agar gels. The diffusion coeff. decreased with increase in the concn. of gel. The coeff. of diffusion was higher the lower the valency of the cation. A fraction of low degree of aggregation increased the diffusion coeff. because, through adsorption on the surface of its micelles, the fraction increased the softness of the gel by decreasing the attraction field of the micelles. A. A. Podgorny

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

SHOW SUBJECT

SHOW DIVISION

SHOW LETTER

SHOW DIVISION

SHOW LETTER

1ST AND 2ND ORDERS										3RD AND 4TH ORDERS									
PROCESSES AND PROPERTIES INDEX																			
<p>3</p> <p>Dielectric constant of the fractions of lyophilic substances.</p> <p>II. Dielectric constant of the fractions of agar-agar. M. S. Shul'man. <i>Colloid J.</i> (U. S. S. R.) 6, 747-51 (1940); cf. C. A. 34, 934'.—The dielec. consts. of highly and slightly sanded, fractions of agar-agar were the same and decreased with increase in concn. The dielec. const. of the solns. of the fractions of agar-agar decreased with increase in temp. but the difference between the dielec. const. of the solns. and of water remained const. The sec. const. did not change during aging of fractions.</p> <p>A. A. Podgorny</p>										<p>2</p>									
<p>ASS-31.6 METALLURGICAL LITERATURE CLASSIFICATION</p>																			
<p>1ST ORDER</p>										<p>2ND ORDER</p>									
<p>3RD ORDER</p>										<p>4TH ORDER</p>									

QA

Apparatus for determination of degree of swelling. M.
S. Shul'man. *Zuradskaya Lab.* 10, 1404(1950).—A
buret fitted at its upper end into a rubber fitting carrying
a porous-filtering crucible is used. The crucible is covered
with a stopper provided with a stopcock. The buret is
filled with H_2O from below and the specimen is placed in
the crucible. The app. is inverted and a slight air pressure
is used to fill the crucible with H_2O . After a given time
interval the app. is re-inverted and the vol. of H_2O is again
measured in the buret. The vol. change corresponds
to the uptake by the specimen. G. M. Kosolapoff

At-12 INST. Alcohol Industry

CA

Twenty five years of the scientific activity of S. M.
✓ Lipatov. Z. A. Rogovin and M. Shul'man. *Kolloid.*
Zhur. 12, 158-9(1950). J. J. Bikerman

SHUL'MAN, V. S.

USSR/Chemistry - Starch

Sep/Oct 51

"Problem of the Electrochemistry of Starch. I. Electrical Conductivity of Solutions of Potato Starch," M. S. Shul'man, S. M. Lipstov, All-Union Sci Res Inst of Alc Ind

"Kolloid Zhur" Vol XIII, No 5, pp 383-387

Investigated elec cond of native and further dispersed starch at various frequencies. Showed that at wave lengths of 200 m and higher cond is unaffected by frequency, and that self-cond of dextrinized and dispersed starch solns has practically the same magnitude. Established that

1967b

USSR/Chemistry - Starch (Contd)

Sep/Oct 51

self-cond of starch solns corresponds to difference between cond of soln and cond of suspension having starch concn of soln in question.

1967b

CA

The electrochemistry of starch. II. Cataphoresis of solutions of potato starch. M. S. Shul'man and S. M. Lipatov. Kolloid. Zhur. 14, 126-128 (1952); ref. C.A. 46, 2627k. —The cataphoretic mobility μ of suspended starch (I) is 0.97 to 1.97×10^{-4} sq. cm./v. sec. independently of concn. (1-8%), while μ of gelatinized starch (II) changes from 1.84×10^{-4} in 0.25% to 0.91×10^{-4} in 1% soln. In 0.01 N NaCl, μ of I has the same value, but μ of II is lowered to 1.2 to 0.6×10^{-4} for the same concns. The μ was detd. in a U tube, and liquid decanted from starch sediment was used as the supernatant liquid. The elec. cond. of 0.01 N NaCl was lowered by 7% when 0.5-1% II was added. J. J. Bikerman

A-U Sci Res INST. Alcohol Industry

2

CA

¹ Kinetics of the heating of starch in a high-frequency field. M. S. Shul'man, *Kolloid. Zhur.* 14, 215-18(1952); cf. *C.A.* 46, 2827h.—A test tube filled with starch was heated by high-frequency field. The excess, ΔT , of the temp. of the starch above the room temp. increased with the time of heating first rapidly and then more slowly. ΔT after heating for 20 min. increases with the water content x up to $x = 12-20\%$, decreases to a min. at $x = 20-30\%$, again increases to a max. at 50-55%, and finally decreases at higher x . This behavior presumably is due to the effect of x on the rate of migration of moisture in a temp. field. Different starches gave similar ΔT - x curves. After 20 min. heating at $x = 50\%$, ΔT increased from amylopectin to native or gelatinized starch, and to dispersed starch. The difference between

starches is attributed to the difference in their elec. cond.
J. J. Bikerman

A-11 Sci Res INST. ALc. IND.

SHUL'MAN, M.S.

The electrochemistry of starch. III. Electric conductivity of starch
solution in different conditions of gelatinization and aging. Kolloid.
Zhur. 15, 216-18 '53. (MLRA 6:5)
(CA 47 no.18:9108 '53)

SHULMAN, M.S.

USSR.

The structure of starch. IV. Dielectric properties of native and disperse starch of different degrees of hydration. M. S. Shul'man and S. M. Lipatov (Sci. Research Inst. Milk Ind., Moscow). *Kolloid. Zhur.* 16, 470-3, *Colloid J. (U.S.S.R.)* 16, 445-7 (1954) (Engl. translation); cf. *Kolloid Zhur.* 8, 452 (1946); *C.A.* 44, 11137g. — At a given wt. concn., the dielec. const. ϵ of aq. solns. of starch (native, disperse, or sol.), dextrin, maltose, and glucose was identical; thus, the dipole moment of the polar groups was independent of the mol. wt. of the polymer. — Also the imaginary part of ϵ was identical for starch and glucose solns. The ϵ' of moist solid starch increased with the moisture content f ; at a given f it was least for starch < starch monoacetate < starch diacetate < starch triacetate. The variation of ϵ' with temp. was different for different f ; at large f an increase of ϵ' at, e.g., 60° indicated start of gelatination. J. J. Bikerman

SHUL'MAN, M.S.; FERTMAN, G.I.

Physical and chemical principles of saccharification processes.
Spir. prom. 20 no.2:13-15 '54. (MLBA 7:6)
(Sugar) (Starch)

SHUL'MAN, M. S.

✓ The production of spirits from colloiddally dispersed starch materials. S. M. Lipatov, M. S. Shul'man, and R. Yu. Svetnik. *Trudy, Vsesoyuz. Nauch. Issledovatel. Inst. Spirt. Prom.* 1955, No. 5, 18-32; cf. *C.A.* 44, 11137g. — On the basis of phys.-chem. studies of the properties of starch dispersed with the use of the colloid mill it is concluded that

such mech. treatment disintegrates cryst. starch to an amorphous condition. Fermentation expts. on oats and barley so prepd. showed an increase in the alc. yield of 4% to 7%. H. L. Olin

SHUL'MAN, M. S.

1252. A polarographic method for determining aldehydes in ethanol. M. S. Shul'man and O. F. Gavrilova. *Tr. Vses. Nauch.-Issled. Promyshlennosti*, 1955, (5), 176-178; *Ref. Zhur. Khim.*, 1956, Abstr. No. 43,568. The content of formaldehyde, acetaldehyde and furfuraldehyde in ethanol is determined polarographically in the presence of NaOH, KOH or LiOH. Ethanol is diluted to a 50 to 70% concn., to 10 ml of which 1 ml of N alkali is added; this mixture is polarographed without the removal of O. In determining acetaldehyde, LiOH is used as background; for furfuraldehyde, NH₄Cl, KOH, NaOH or LiOH; and for formaldehyde, NaOH, KOH or LiOH is used. With LiOH as background it is possible to determine acetaldehyde and furfuraldehyde together. The error is $\pm 0.0003\%$ (abs.).
R. Lord

pm mk

Shutman, M.S.

Distr: 1/243/1/310/1/33d

The effect of stoichiometric deviations on the dielectric properties of barium titanate. 7 M. S. Novosil'tsev, A. L. Khodakov, and M. S. Shutman. *Trudy Nauch.-Issled.-skol. Pis. Mat. Inst. Khab. Univ.* 27, No. 6, 9-21 (1986); *Referat. Zhur.*, Khim. 1986, Abstr. No. 24404; cf. C.A. 49, 6576f. — The dielec. properties of BaTiO₃ ceramics with a stoichiometric deviation of BaO to TiO₂ in the limits 1.024 to 0.940 are investigated. It is found that the majority of the properties depend basically on the compn. (with the exception of the Curie point and the frequency effect on ϵ') which explains the disagreement in results in Ba titanate investigation by different authors. The use of chemically pure materials for prep. BaTiO₃ is difficult because of the bad sintering of the samples. The presence of admixts. helps the sintering but destroys the stoichiometric ratio. It is established that in high-frequency fields with potentials up to 0.5 kv./cm., the dielec. const. and its temp. dependence are scarcely affected by the field potential. At 50 cycles, ϵ' and its temp. dependence are considerably affected by the field gradient, especially at 5.0 kv./cm. In fields to 8 kv./cm. for all compns. no curve distortion, caused by nonlinearity, is observed. After subjection to strong fields of industrial frequency, the ϵ' and $\tan \delta$ rise by about 4-8%. This after-effect and its relaxation time depend on the compn. N. Vasileff.

DM

JK

SHUL'MAN, M. S.

Study of the adsorptive capacity of carbohydrate solutions
by the polarographic method. M. S. Shul'man (All-Union
Sci. Research Inst. Alcohol Ind., Moscow). *Kolloid.*
24:7-19, 384-8 (1957). The polarographic max. at the
reduction of O_2 to H_2O_2 in 0.02N KCl was little depressed
by arabinose and glucose even when their concn. was 0.1%;
sucrose and maltose were more effective, and dextrin, native
starch, and gelatinized starch fully depressed the max.
in about 0.07% concn. J. J. Bikerman

PM

SHUL'MAN, M.S.; GAVRIKOVA, O.F.

Determining acids and esters in alcohol. Spirt. prom. 23 no.2:16-17
'57. (MIRA 10:4)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut spirtovoy promyshlennosti (for Shul'man). 2. Rosglavspirt (for Gavrikova).
(Acids--Analysis) (Esters--Analysis) (Alcohol--Analysis)

The accepted Soviet standard method GOST 5964-51 is changed. The titrations are done at 45-50°, and phenolphthalein (I) is replaced by bromo-thymol blue (II). The error introduced, as I changes at different pH than II, is actually compensated by the fact that in the method described the last parts. of the higher esters are never completely hydrolyzed. Two tables show that this rapid modified method furnishes values acceptable for plant use.

SHUL'MAN, M.S.; GAVRIKOVA, O.F.; Prinsipala uchastiye: ABROSIMOVA, V.A.

Determining pentoses and pentosans in the molasses beer of the distilling industry. Trudy TSNIISP no.6:163-166 '58. (MIRA 14:12)
(Pentoses) (Pentosans)

SHUL'MAN, M.S.; SAMOKHVALOV, L.A.

Polarographic analysis in the hydrolysis and sulfite alcohol industries.
Gidroliz. i lesokhim.prom. 11 no.8:17-19 ' 58. (MIRA 11:12)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut spirtovoy promysh-
lennosti (for Shul'man). 2. Vsesoyuznyy nauchno-issledovatel'skiy
institut gidroliznoy i sul'fitno-spirtovoy promyshlennosti (for
Samokhvalov).
(Polarography) (Yeast) (Chemistry, Analytical)

SHUL'MAN, M.S.; SEMEVSKAYA, V.Ye.

Polarographic determination of sugars in sugar beet molasses.
Spart. prom. 24 no. 4:13-15 '58. (MIRA 11:7)
(Molasses)
(Sugars)

SHULMAN, M.S.

SHULMAN, M.S.

Polarographic analysis of carbohydrates. Sakh. prom. 32 no.1:35-37
Ja '58. (MIRA 11:2)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut spirtovoy promysh-
lennosti.
(Polarograph and polarography) (Sugars--Analysis and testing)

SHUL'MAN, M.S.; OSHMYAN, G.L.; GAVRIKOVA, O.F.; Prinimala uchastiye:
GUSEVA, A.A.

Methods of determining aldehydes in alcohols kept in barrels
made of oak. Trudy TSNIISP no.7:150-153 '59. (MIRA 13:9)
(Aldehyde) (Alcohol)

SHUL'MAN, M.S.; SEMEVSKAYA, V.Ye.

Determination of molasses sugars by the polarographic method.
Trudy TSNIISP no. 8:99-107 '59. (MIRA 14:1)
(Molasses) (Sugars)

SHUL'MAN, M.S.; SEMEVSKAYA, V.Ye.

Certain properties of the nonsugars of molasses. Trudy TSNIISP
no. 8:107-110 '59. (MIRA 14:1)
(Molasses—Analysis)

SHUL'MAN, M.S.; GAVRIKOVA, O.F. [deceased]

Conductometric analysis of the acidity of beer and yeasts.

Trudy TSNIISP no. 8:110-116 '59.

(MIRA 14:1)

(Conductometric analysis) (Alcohol)

FERTMAN, Grigoriy Isaakovich; SHUL'MAN, Mark Solomonovich; SMIRNOV, V.A.,
prof., retsenzent; RAYEV, Z.A., kand.tekhn.nauk, retsenzent;
KOVALEVSKAYA, A.I., red.; SOKOLOVA, I.A., tekhn.red.

[Physicochemical principles of the production of alcohol] Fiziko-
khimicheskie osnovy proizvodstva spirita. Moskva, Pishchepromizdat,
1960. 258 p. (MIRA 13:11)

(Alcohol)

SAMOKHVALOV, L.A.; SHUL'MAN, M.S.

Polarographic analysis in hydrolysis and sulfite alcohol
production processes. Report No.2: Investigating the
process of solution of oxygen during the cultivation of yeasts.
Gidroliz.i lesokhim.prom. 13 no.4:4-7 '60. (MIRA 13:7)
(Kansk--Yeast) (Oxygen--Analysis)

STEPANISHCHEV, K.P.; SHUL'MAN, M.S.

Apparatus for the continuous dialysis of ferments in
solutions. Spirt.prom. 26 no.1:5-9 '60. (MIRA 13:6)
(Electrodialysis) (Enzymes)

SHUL'MAN, M.S.; KOVALEVSKAYA, A.I., red.; KISINA, Ye.I., tekhn.red.

[Mechanical formation of starch sizes] Mekhanicheskaya
kleisterizatsiya krakhmala. Moskva, Pishchepromizdat, 1961.
148 p. (Moscow. Tsentral'nyi nauchno-issledovatel'skii insti-
tut spirtovoi i likerovodochnoi promyshlennosti. Trudy, no.10)
(MIRA 14:7)

(Starch)

SHUL'MAN, M.S.

[Authors' abstracts of completed research]Avtoreferaty vpolnen-
nykh issledovani. Moskva, TSentr. nauchno-issl. in-t spirtovoi
i likerno-vodochnoi promyshl. pri VSNKh, 1962. 32 p.

(MIRA 15:12)

(Distilling industries--Research)

SHULMAN, M. S.

Increasing the purity of fermentation preparations. Spirt.
prom. 28 no.8:10-11 '62. (MIRA 16:1)

1. Tsentral'nyy nauchno-issledovatel'skiy institut spirtovoy
promyshlennosti.

(Fermentation)

SHUL'MAN, M.S.; APATTSEVA, V.V.

Effect of electrolytes on the settling of amylase enzymes from
Aspergillus pryzae. Trudy TSNIISP no.12:35-39 '62. (MIRA 17:3)

SHUL'MAN, M.S. (Sverdlovsk, ul. Kirova 7, kv.1)

Mastopathy in a man with pathological excretions from both
breasts. Vop. onk. 9 no.7:91-92 '63 (MIRA 16:12)

1. Iz Sverdlovskogo oblastnogo onkologicheskogo dispansera
(glavnyy vrach - I.A.Arkhangel'skaya).

SHUL'MAN, M. S.; DEMINA, A. S.; MOROZOVA, V. T.

Amylase sorption from solutions of fermentation preparations.
Spir. prom. 29 no.3:13-15 '63. (MIRA 16:4)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut fermentnoy
i spirtovoy promyshlennosti.

(Amylase) (Sorption)

SHUL'MAN, M.S.

Improving the technology of the production of ferments. Sprit.prom.
29 no.5:12-13 '63. (MIRA 17:2)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut fermentnoy i spirtovoy
promyshlennosti..

SAMOKHVALOV, L.A.; SHUL'MAN, M.S.

Polarographic oxygen assay in the culture fluid of micro-organisms. Mikrobiologiya 32 no.5:896-901 S-0'63
(MIRA 17:2)

1. Institut epidemiologii i mikrobiologii imeni N.F.Gamalei
AMN SSSR.

SHUL'MAN, M.S., doktor med. nauk (Orechovsk)

Development of oncological institutions in the Urals. Trudy
Perm. gos. med. inst. 43, 382-384 1963. (MIRA 17:6)

SHUL'MAN, M.S.

Stand-mounted unit for enzyme sorption. Ferm. i spirt. prom. 30
no.1:15-16 '64. (MIRA 17:11)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut fermentnoy i
spirtovoy promyshlennosti.

SHUL'MAN, M.S.

Polymeric materials and their use in the distilling industry.
Ferm. i spirt. prom. 30 no.2:16-20 '64. (MIRA 18:2)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut fermentnoy i
spirtovoy promyshlennosti.

SHUL'MAN, M.S.

Precipitation of enzymes by organic solvents. Koll. zhur. 27
no.2:284-286 Mr-Ap '65. (MIRA 18:6)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut fermentnoy i
spirtovoy promyshlennosti, Moskva.

SHUL'MAN, M.S.; APATTSEVA, V.A.

Sorption of ferments by sefadex. *Ferm.i spirt.prom.* 31 no.1:14-16
'65. (MIRA 18:5)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut fermentnoy i
spirtovoy promyshlennosti.

SHUL'MAN, M.S.

Inactivation of ferments. Ferm. i spirt. prom. 31 no.6:6-7 '65.
(MIRA 18:9)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut fermentnoy i
spirtovoy promyshlennosti.

SHUL'MAN, M. S.

In. N. Beliaev, N. S. Novosil'tsev, A. L. Khodakov, M. S. Shul'man.

Dielectric properties of various brands of titanium dioxide. P. 547.

Oct 15, 1950

SO: Journal of Technical Physics, Vol. XXI, No. 5, May 1951

SHULMAN, M. S.

5
1 m

USSR !

The effect of deviations from stoichiometric composition on the properties of the ceramic material BaTiO_3 in strong fields. N. S. Novosil'tsev, A. I. Khodakov, and M. S. Shul'man (State Univ., Rostov-on-Don). *Zhur. Eksp. i Teor. Fiz.* 23, 838-9 (1952); cf. C.A. 47, 931h. — Polycryst. samples of BaTiO_3 were studied in strong fields. Even small deviations from 1 for the ratio BaO/TiO_2 (from 1.024 to 0.940) have a significant effect on the dielec. properties. The relation of the dielec. permeability to temp., compn., and field strength was detd. J. R. L.

BB

AP
BE

1. NOVOSIL'TSEV, N. S.; KHODAKOV, A. L.; SHUL'MAN, M. S.
2. USSR (600)
4. Barium Compounds
7. Metastable states of BaTiO₃. N. S. Novosil'tsev, A. L. Khodakov, M. S. Shul'man.
Dokl. AN SSSR 83 No. 6 1952. Fiziko-Matematicheskii Institut Pri Rostovakom
Na Donu Gosudarstvennom Universitete im. V. M. Molotova recd. 15 Feb. 1952
9. Monthly List of Russian Accessions, Library of Congress, September 1952. UNCLASSIFIED.

GLUKHOV, Lev Nikolayevich; SHUL'MAN, Mark Vladimirovich; BORTAKOVSKIY,
Sergoy Yakovlevich; SOLGANIN, G.Ya., vedushchiy red.; MUKHINA,
E.A., tekhn.red.

[Underground reservoirs for light petroleum products] Podzemnye
rezervuary dlia svetlykh nefteproduktov. Moskva, Gos.nauchno-
tekhn.izd-vo neft. i gorno-toplivnoi lit-ry, 1960. 129 p.
(MIRA 13:3)

(Petroleum products---Storage)

SHUL'MAN, M.Ya.

Automatic control of the preparatory operations for picture
taking with amateur cameras. Zhur. nauch. i prikl. fot.
i kin. 9 no.1:62-79 Ja-F'64. (MIRA 17:2)

SHUL'MAN, M.Ya.

Basic trends in the improvement of present-day cameras. Zhur.
nauch. i prikl. fot. i kin. 10 no.2:152-159 Mr-Ap '65.

(MIRA 18:5)

SHUL'MAN, Nikolay Karlovich, kand.geograf.nauk; OVECHKINA, L.S., red.;
DEMENT'YEVA, G.M., tekhn.red.

[The city of Svobodnyy; concise economic-geographical study]
Gorod Svobodnyi; kratkii ekonomiko-geograficheskii ocherk.
Blagoveshchensk, Amurskoe knizhnoe izd-vo, 1958. 38 p.
(MIRA 13:4)

(Svobodnyy)